

L 26702-66

ACC NR: AT5028448

olving the first group of problems. In the second group, the first derivatives are computed from nondifference formulas of numerical differentiation obtained from a Lagrange interpolation formula. Feedbacks are simulated either by iteration cycles or by a transformation of the system transfer function. The accuracy of calculations is discussed, and techniques for its improvement (such as alternating the differentiation and integration operations) are suggested. Orig. art. has: 5 figures and 8 formulas.

SUB CODE: 09,12 / SUBM DATE: none / ORIG REF: 003

Card

2/2

MOS

L 10703-66 ENT(m)/ENT(t)/ETI IJE(1) JN/IN/IN  
 ACC NR: AP6018609 SOURCE CODE: UR/0420/65/000/004/0098/0103

AUTHOR: Karlashov, A. V.; Gnatyuk, A. D.; Tokarev, V. P.

ORG: Kiev Institute of Civil Aviation Engineers (Kiyevskiy institut inzhenerov grazh-danskoy aviatsii)

TITLE: Corrosion endurance of D16ATV sheet duralumin, 4

SOURCE: Samoletostroyeniye i tekhnika vozdushnogo flota, no. 4, 1965, 98-103

TOPIC TAGS: sheet metal, fatigue strength, sea water corrosion, aluminum alloy/ D16ATV aluminum alloy

ABSTRACT: Data are given from experimental studies of the corrosion resistance of D16ATV duralumin alloy which is widely used in aircraft construction. The corrosion media were fresh water and a 3% NaCl solution simulating sea water. The tests were done on a machine with a loading frequency of 200 cycles per minute on a test base of  $5 \cdot 10^6$  cycles. The specimens were tested for fatigue under pure bending conditions to a given deformation. The specimens were made from 2.0 mm sheet duralumin. The chemical composition of the material is as follows (in %): 4.2 Cu, 1.6 Mg, 0.5 Mn, 0.3 Fe, 0.2 Si and 0.5 Zn. Analysis of the experimental results shows that the effect of the corrosive media depends on aggressiveness and the number of test cycles. The maximum reduction in the fatigue limit on a test base of  $5 \cdot 10^6$  cycles was 15 and 42.5% in  $H_2O$

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L 40793-66

ACC NR: AP6018609

and a 3% solution of NaCl respectively. The corresponding values for a test base of  $2 \cdot 10^5$  cycles were 7 and 20% respectively. This increase in the effect of the medium on the fatigue limit of the alloy with an increase in the number of test cycles takes place in the range of maximum amplitude stresses. There is no further increase in this effect when these stresses are reduced. Aggressive media have a greater effect on the durability of the material than on its fatigue strength. A probabilistic evaluation of the fatigue limits for aluminum alloys gives a more exact figure for the effect of corrosive media on the fatigue strength of the material for establishing the service life of structural elements subjected to the action of these media. Orig. art. has: 3 figures, 2 tables.

SUB CODE: 11, 29/01/ SUBM DATE: none/ ORIG REF: 006

Card 2/2 MLP

KARIASHOV, A.V.; GNATYUK, A.D.; TOKAREV, V.P.

Effect of corrosive and surface-active media on the resistance  
of aluminum alloys. Fiz.-khim. mekh. mat. 1 no.1:7-11 '66.

(MIRA 19:1)

1. Kiyevskiy institut grazhdanskoy aviatsii. Submitted August 12,  
1964.

KARLASHOV, A.V.; GNATYUK, A.D.; TOKAREV, V.P.

Fatigue strength and durability of aluminum alloys in corrosive media. Fiz.-khim. mekh. mat. 1 no.5:542-547 '65. (RA 19:1)

1. Kiyevskiy institut inzhenerov grazhdanskoy aviatsii. Submitted Feb. 27, 1965.

KAPLASHOV, A.V.; TOKAREV, V.P.

Effect of the frequency of loading on the fatigue and corrosion-  
fatigue strength of the B95 alloy with a stress concentrator.  
Fiz.-khim. mekh. mat. 1 no.5:548-551 '65. (MISA 19:1)

1. Kiyevskiy institut inzhenerov grazhdanskoy aviatsii. Submitted  
June 5, 1965.

*TOKAREV V. I.*

APTEKAREVA, Ye.I., SHMELEV, N.S., TOKAREV, V.T.

Nikolai Grigor'evich Dam'e; on his 60th birthday. Ortop.travm  
i protez 19 no.2:84 Mr-Ap '58 (MIRA 11:5)  
(DAM'E, NIKOLAI GRIGOR'EVICH, 1897-)

GRODZOVSKIY, G.L. (Moskva); DYUKALOV, A.N. (Moskva); TOKAREV, V.V. (Moskva);  
TOLSTYKH, A.I. (Moskva)

Self-simulating gas motions with shock waves propagating with a  
constant speed in a motionless gas. Prikl. mat. i mekh. 23 no.1:  
198-200 Ja-F '59. (MIRA 12:2)  
(Aerodynamics, Supersonic)



TOKAREV, V.V. and TOLSTYKH, A.I., GROZDOVSKIY, G.L., DYUKALOV, A.N.,

"Electrical Current in an Axisymmetric Meridian Flow Field of a Conducting Fluid; smoothing of parameters in viscous helical flows."

Report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

69295

10.2000A

S/179/60/000/01/006/034

E031/E535

AUTHORS: Grodzovskiy, G.L., Dyukalov, A.N., Tokarev, V.V. and Tolstykh, A.I. (Moscow)

TITLE: The Axisymmetric Meridional Flow of a Conducting Fluid. Equalization of the Parameters of the Rotational Flow of a Viscous Fluid

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1960, Nr 1, pp 41-46 (USSR)

ABSTRACT: The electrodynamic equations of magnetohydrodynamics and the equation for the current density  $j$  are simplified by the assumption that the velocity and current density components  $v_\theta$  and  $j_\theta$  are zero, (a cylindrical coordinate system,  $r, \theta, x$  is used). For meridional flow of an incompressible conducting fluid at constant velocity  $v_x = v_0$ ,  $H_r = H_0$ , and a further simplification can be made. A solution for  $H_\theta$  is sought in separable form as  $X(x)R(r)$ . To this solution a linear term in the radius is added to satisfy the equations of motion. Boundary conditions are derived by assuming that the cylinder which bounds the fluid is non-conducting. Similarly to the known exact

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S/179/60/000/01/006/034  
E031/E535

The Axisymmetric Meridional Flow of a Conducting Fluid. Equalization  
of the Parameters of the Rotational Flow of a Viscous Fluid

solution of the flow of a viscous incompressible fluid it is shown that in the case of the meridional flow of an incompressible conducting fluid the equations of magnetohydrodynamics permit of a class of "automodel" solutions (dimensional analysis is invoked). The velocity and field components and the pressure are expressed in terms of the non-dimensional parameter  $\zeta = x/r$  and the functions of this parameter which occur are determined by the solution of four ordinary differential equations. These equations are solved by introducing a function related to the stream function. The direction of the current along rays passing through the origin is a characteristic of the flows under discussion. Two examples are discussed. One is a conical charge in an unbounded medium. The other is a charge in a conical channel with non-conducting walls. Finally the similarity of the above problem with that of the axisymmetric flow of a viscous fluid moving with constant velocity inside a

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X

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S/179/60/000/01/006/034  
E031/E535

The Axisymmetric Meridional Flow of a Conducting Fluid. Equalization  
of the Parameters of the Rotational Flow of a Viscous Fluid

cylinder in the absence of friction at the walls is  
discussed.

There are 3 figures and 6 Soviet references.

SUBMITTED: April 14, 1959

Card 3/3

TOKAREV, V.V.; TOLSTOPYATOV, K.S.; OKUNEV, L.R.

Voltage regulator for supplying measuring circuits of electronic  
potentiometers. Sbor.rats.predl.vnedr.v proizvod. no.1:37-38 '61.  
1. Zavod "Elektrostal'." (MIRA 14:7)

(Voltage regulators)

ТОКАРЕВ, В. В.

- a. Chernobyl, I. O.
- b. Chernobyl, I. O.
- c. Chernobyl, I. O.
- d. Chernobyl, I. O.
- e. Chernobyl, I. O.
- f. Chernobyl, I. O.
- g. Chernobyl, I. O.
- h. Chernobyl, I. O.
- i. Chernobyl, I. O.

reports to be presented at the IAU's International Astronomical Congress,  
Washington D. C. 1-7 October 1961

(19)

21966

S/020/61/137/005/011/026

B104/B214

3.2200 (1062,1080,1132)

AUTHORS: Grodzovskiy, G. L., Ivanov, Yu. N., and Tokarev, T. T.

TITLE: Motion of a body with variable mass and constant power consumption in a gravitational field

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 5, 1961, 1082-1085

TEXT: The present paper gives a study of the general case of the optimization of the reactive motion of a body with variable mass in a gravitational field of two centers when the power consumption is constant. For a given trajectory, the acceleration is equal to  $a(t) = -Vdm/mdt$ , where  $V$  is the escape velocity. The utilizable reactive power may be written as  $N = -dmV^2/2dt$ . Thus,  $a^2/2N = -dm/m^2dt$ . This gives by integration the

weight of the body as a function of time:  $G = G_0 \left( 1 + \int_0^T \frac{G_0}{2Ng} a^2 dt \right)$ . The

specific weight of the power source is defined as:  $\alpha = G_N/N$ , and the

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S/020/61/137/005/011/026  
B104/B214

Motion of a body with variable ...

relative total weight initially is given by  $\bar{G} = (G_M + G_N)/G_0$

$= \alpha |N/G_0 + 1 - 1 - 1| \left( 1 + \int_0^T \frac{G_0}{2Ng} a^2 dt \right)$ . For a given  $a(t)$  the quantity  $\bar{G}$

has a minimum:  $\bar{G}_{\min} = 2\sqrt{\Phi} - \Phi$  at  $(G_N/G_0)_{\text{opt}} = (\alpha N/G_0)_{\text{opt}} = \sqrt{\Phi} - \Phi$ ,

where  $\Phi = \frac{\alpha}{2g} \int_0^T a^2 dt$ . In the case of a step by step decrease of power

related to a decrease in weight, the maximum relative utilizable weight may be calculated from the formula

$$\bar{G}_{\text{п. макс}} = (1 + \Phi_1 - 2\sqrt{\Phi_1}) \prod_{i=1}^n \left( \frac{1 - \Phi_i}{1 + \Phi_i} \right)^2 \quad (4), \quad (4).$$

Here,  $\sum \phi_i = \Phi$  is given. The optimum ratio between the  $\phi_i$  may be

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Motion of a body with variable ...

S/029/61/137/005/011/026  
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obtained from (4) by differentiation. Fig. 1 graphically shows  $\bar{G}_{\min}$  and  $G_H/G_0$  as functions of  $\phi$ . As is seen from this graph, a minimum of  $\bar{G}$

requires a minimum of the integral  $\int_0^T a^2 dt$ . As an illustration, the

motion in a plane spiral is studied in the case of small accelerations.

The result obtained is:  $r/R_0 = 1 / \left( 1 - \int_0^t k(t) dt / \frac{R_0}{v_0} \right)^2$ . The next topic

studied is the optimum displacement of a body of variable mass in the time  $T$  between two given points. This problem leads to a variation problem for

the integral  $I = \int_0^T a^2(t) dt$ . Here, the plane motion in the gravitational

field of two centers is investigated, one of which is at rest and the other

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Motion of a body with variable ...

moves with constant angular velocity  $\omega$  on a circle of radius  $r_0$  about this center. In order to study the motion of the body in a region in which one of the two centers has a dominating effect on the motion of the body, it is convenient to place the reference system in this center. On these assumptions, the integral of the variation problem introduced above yields the integral

$$I = \int_0^T \left\{ \left[ \ddot{r}_i - r_i(\dot{\psi}_i + \omega)^2 + \frac{k_i}{r_i^2} - \mathfrak{R}_i \right]^2 + \left[ r_i \ddot{\psi}_i + 2\dot{r}_i(\dot{\psi}_i + \omega) \Psi_i \right]^2 \right\} dt. \quad (9)$$

Euler's equations of this variation problem are:

$$\dot{a}_{r_i} = \frac{1}{v_{r_i}} \left[ \frac{a_{r_i}^2 + a_{\psi_i}^2}{2} + a_{r_i} \left( \frac{v_{\psi_i}^2}{r_i} - \frac{k_i}{r_i^2} \right) - \lambda_i - v_i \frac{v_{\psi_i}}{r_i} \right], \quad (10)$$

$$\dot{a}_{\psi_i} = \frac{1}{r_i} (a_{\psi_i} v_{r_i} - 2a_{r_i} v_{\psi_i} + v_i); \quad (11)$$

$$\dot{\lambda}_i = a_{\psi_i} \Psi'_{i r_i} + a_{r_i} \mathfrak{R}'_{i \psi_i}; \quad (12)$$

$$\dot{\lambda}_i = -v_{r_i} \left( a_{\psi_i} \Psi'_{i r_i} + a_{r_i} \mathfrak{R}'_{i r_i} + \frac{\Psi_i}{r_i} a_{\psi_i} \right) - v_i \frac{\Psi_i}{r_i} - \dot{a}_{r_i} \mathfrak{R}_i - \frac{v_{\psi_i}}{r_i} (v_i - 2a_{r_i} \Psi_i);$$

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Motion of a body with variable ...

$$v_{r_l} = \dot{r}_l, \quad v_{\phi_l} = r_l(\dot{\psi}_l + \omega). \quad (14)$$

The problem is simplified and limited to the following variation problem:  
It is desired to find a trajectory which gives a minimum for

$\int_{r_1}^{r_2} a^2 dr / v_r$  under the additional isoperimetric condition. The time for  
the displacement from  $r_1$  to  $r_2$   $\left( T = \int_{r_1}^{r_2} dr / v_r \right)$  and the polar angle of

the displacement  $\Delta\psi = \int_{r_1}^{r_2} v_\psi dr / r dr$  are given. With their help, expressions

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Motion of a body with variable ...

can be found for  $\dot{a}_r$  and  $\dot{a}$  which agree with (10) and (11) for  $\alpha = 2\lambda$ , and  $\alpha_2 = 2\nu$ . It is shown that in the case of the free fall along the optimum trajectory the acceleration varies linearly with time. Finally, the singularities of the system are also studied. There are 2 figures and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J. H. Irving, E. K. Blum, Vistas in Astronautics, 2, Second Annual Astronautics Symposium, 1959.

ASSOCIATION: Tsentral'nyy aero-gidrodinamicheskii institut im. N. Ye. Zhukovskogo (Central Institute of Aero- and Hydrodynamics imeni N. Ye. Zhukovskiy)

PRESENTED: August 1, 1960, by L. I. Sedov, Academician

SUBMITTED: July 24, 1960

Card 6/7

POTAPOVA, T.A.; TOKAREV, V.V.

Determination of metal content in an aluminum cell with  
the help of the isotope Au<sup>198</sup>. TSvet. met. 35 no.7:51-54  
Jl '62. (MIRA 15:11)

(Aluminum--Electrometallurgy)  
(Radioisotopes--Industrial applications)

GRODZOVICH, G. L. , IVANOV, Yu. N. and CHERNY, V. V.

"On the Motion of a Body of Variable Mass with Constant and  
Decreasing Power Consumption in a Gravitational Field."

Report presented at the 13th Intl. Astronautics Congress, Varna, Bulgaria, 23-29 Sep 62.

L 17077-63 ES(w)-2/EPR/EPA(b)/FMT(1)/FS(b)/FMT(m)/FWG(k)/FCC(w)/FS(v)-2/BDS/ES(v)  
 AEDC/AFFTC/ASD/AFMDC/PSL-3/APGC/AFWL/ICP(1) SSD Pa-4/Pd-4/Pz-4/Pe-4/Pab-4/  
 Po-4/Pg-4/Pq-4 WW/GW  
 ACCESSION NR: AP3006364 S/0258/63/003/003/0590/0615

AUTHOR: Grodzovskiy, G. L. (Moscow); Ivanov, Yu. N. (Moscow);  
Tokarev, V. V. (Moscow) 108

TITLE: The mechanics of space flight with low thrust. I.

SOURCE: Inzhenernyy zhurnal, v. 3, no. 3, 1963, 590-615

TOPIC TAGS: space flight, solar sail, low thrust, rocket thrust,  
 space ship, space flight mechanics, low thrust rocket, low thrust  
 vehicle

ABSTRACT: This article is the first in a series of review articles  
 dealing with the mechanics of space flight at low thrust. On the  
 basis of Soviet and non-Soviet sources the article reviews these  
 principal subject areas: 1) the mechanics of space flight with a  
 solar-sail space vessel, including fundamental relationships and  
 problems and the flight of such a vessel between planetary orbits  
 and its escape from a gravitational field; and 2) the mechanics of  
 space flight with low-thrust engines, including the selection of  
 optimum weight ratios for simpler cases of motion and an ideal

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L 17077-63

ACCESSION NR: AP3006364

control system with optimum weight and thrust control. The following recent works are noted among the 20 Soviet sources reviewed: V. K. Isayev, "The principle of L. S. Pontryagin's maximum and the optimum programming of rocket thrust," *Avtomatika i telemekhanika*, v. 22, no. 8, 1961, and v. 23, no. 1, 1962; A. N. Zhukov and V. N. Lebedev, "A variational problem in flight between heliocentric circular orbits by means of a solar sail," *Sb. Iskusstvennyye sputniki Zemli*, 1963, in publication; A. A. Karymov, "Determination of forces and moments of light pressure acting on a body moving in space," *Prikl. matem. i mekhan.*, v. 26, no. 5, 1962; G. L. Grodzovskiy, "Optimization of parameters of motion of a body with variable mass and limited power consumption in the presence of a nonlinear dependence between the power source weight and the power output," *Izv. AN SSSR, Otd. tekhn.*, N. 1963, in publication; and Yu. N. Ivanov, "The motion of a body with variable mass, limited power output, and given time of operation," *Prikl. matem. i mekhan.*, v. 27, no. 5, 1963. Orig. art. has: 25 figures, and 70 formulas.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: AS

DATE ACQ: 27Sep63

NO REF SOV: 020

ENCL: 00

OTHER: 053

Card 2/2



TOKAREV, V. V., IVANOV, I. N., and GRODZOVSKIY, G. L.,

"On the motion of a body of variable mass with constant and decreasing power consumption in a gravitational field; part III"

report to be submitted for the 14th Congress Intl. Astronautics Federation,  
Paris, France, 25 Sep-1 Oct 1963

GRODZOVSKIY, G.L. (Moskva); IVANOV, Yu.N. (Moskva); TOKAREV, V.V. (Moskva)

Mechanics of space flight with low thrust. Part 2. Inzh.zhur. 3  
no.4:748-766 '63. (MIRA 16:12)

TOKAREV, V.V. (Moskva)

Effect of random deviations from an optimal propulsion  
program on the motion of a body of variable mass with  
constant power consumption in a gravitational field.  
Prikl. mat. i mekh. 27 no.1:27-32 Ja-F '63.

(MIRA 16:11)

ACCESSION NR: AP3004110

S/0040/63/027/004/0629/0640

AUTHOR: Tokarev, V. V. (Moscow)

TITLE: Optimal control of power source for moving a body of variable mass with active breakdown of power source

SOURCE: Prikladnaya matematika i mekhanika, v. 27, no. 4, 1963, 629-640

TOPIC TAGS: optimal control, power source, variable mass body, power source breakdown, reactive jet, fuel supply, fuel consumption, variational problem

ABSTRACT: Yu. N. Ivanov (Optimal'noye umen'sheniye moshchnosti pri dvizhenii tela peremennoy massy\* v gravitatsionnom pole. PMM, 1962, t. XXVI, vy\*p. 4) studied continuous and step-wise decrease of power. The author of the present work generalizes that problem to the case where thrown-off sections of the power source can be partially or completely used as fuel for the creation of thrust. The system of equations describing the motion of a variable mass body in a gravitational field and the weight change of the body are

$$\begin{aligned} \dot{G}_m &= -q_m, \\ \dot{G}_N &= -q_n, \\ \ddot{\mathbf{r}} &= \mathbf{v}, \quad \dot{\mathbf{v}} = \mathbf{i} \frac{\sqrt{(2g/a) G_N N (q_m + \gamma q_n)}}{G_m + G_N + G_n} + \mathbf{R} \end{aligned} \quad (1)$$

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ACCESSION NR: AP3004110

The weight of the body  $G$  is assumed to be distributed among the fuel supply  $G_m$ , the power source  $G_N$  and the payload  $G_n$ , and  $G_m$  and  $G_N$  change with time  $t$ . The weight consumption per second  $q_m(t) \geq 0$  and the  $\gamma$ -part ( $0 \leq \gamma(t) \leq \gamma_{\max} \leq 1$ ) of the consumption  $q_\gamma(t) \geq 0$  are used for creating reactive thrust. The weights  $G_m$ ,  $G_N$ ,  $G_n$  and consumptions  $q_m$ ,  $q_\gamma$  are related to the initial weight of the body. The power of the reactive jet  $N = qV^2/2$  (where  $V$  is discharge velocity) can vary from zero to some maximal value. The maximal amount of power is assumed to be linearly related to the weight of the power source  $N_{\max} = G_N/\alpha$  ( $\alpha$  is the specific gravity of the power source). The power  $N$  is considered in reference to its maximal value, so that  $0 \leq N(t) \leq 1$ . The unit vector  $i(t)$  indicates thrust direction. Moreover,  $r$  and  $v$  denote the radius-vector and the velocity of the body,  $R + R(r, t)$  and  $g$  denote respectively acceleration from gravitational forces at a point and the amount of acceleration of the force of gravity on the earth's surface. The combination

$$\sqrt{(2g/\alpha)G_N N(q_m + \gamma q_\gamma)} / (G_m + G_N + G_n) = a \quad (2)$$

is acceleration from thrust (thrust on the moving mass). A dot denotes differentia-

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ACCESSION NR: AP3004110

tion with respect to time. The author poses the problem of finding the minimal time of motion  $T$  for a given value of payload  $G_n$ . This problem reduces to the following variational problem for system (1): to choose, from the set of piecewise-continuous, piecewise-smooth functions, controls

$$\begin{aligned} 0 \leq N(t) \leq 1, \quad 0 \leq \gamma(t) \leq \gamma_{\max}, \quad |i(t)| \equiv 1 \\ 0 \leq q_m(t) < \infty, \quad 0 \leq q_v(t) < \infty \end{aligned} \quad (3)$$

which guarantee, for given  $G_n$ ,  $\gamma_{\max}$  and  $\alpha$ , the minimal time  $T$  for passage of system (1) from a given initial state

$$G_{m0} + G_{N0} = 1 - G_n \quad (t_0 = 0) \quad (4)$$

to a given final state

$$G_{m1} = 0 \quad (t_1 = T) \quad (5)$$

under the conditions

$$G_m(t) > 0, \quad G_N(t) > 0 \quad (6)$$

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ACCESSION NR: AP3004110

Orig. art. has: 10 figures and 47 formulas.

ASSOCIATION: none

SUBMITTED: 19Jan63

DATE ACQ: 15Aug63

ENCL: 00

SUB CODE: FL

NO REF SOV: 006

OTHER: 002

Card 4/4

TOKAREV, V.V. (Moscow)

"A variational problem of the motion of a variable mass body with random and optimum decrease in power"

Report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow 29 Jan - 5 Feb 64.



GRODZOVSKIY, G. L.; IVANOV, Yu. N.; TOKAREV, V. V.

"Low thrust space flight mechanics." Survey paper.

report submitted for 15th Intl Astronautical Cong, Warsaw, 7-12 Sep 64.

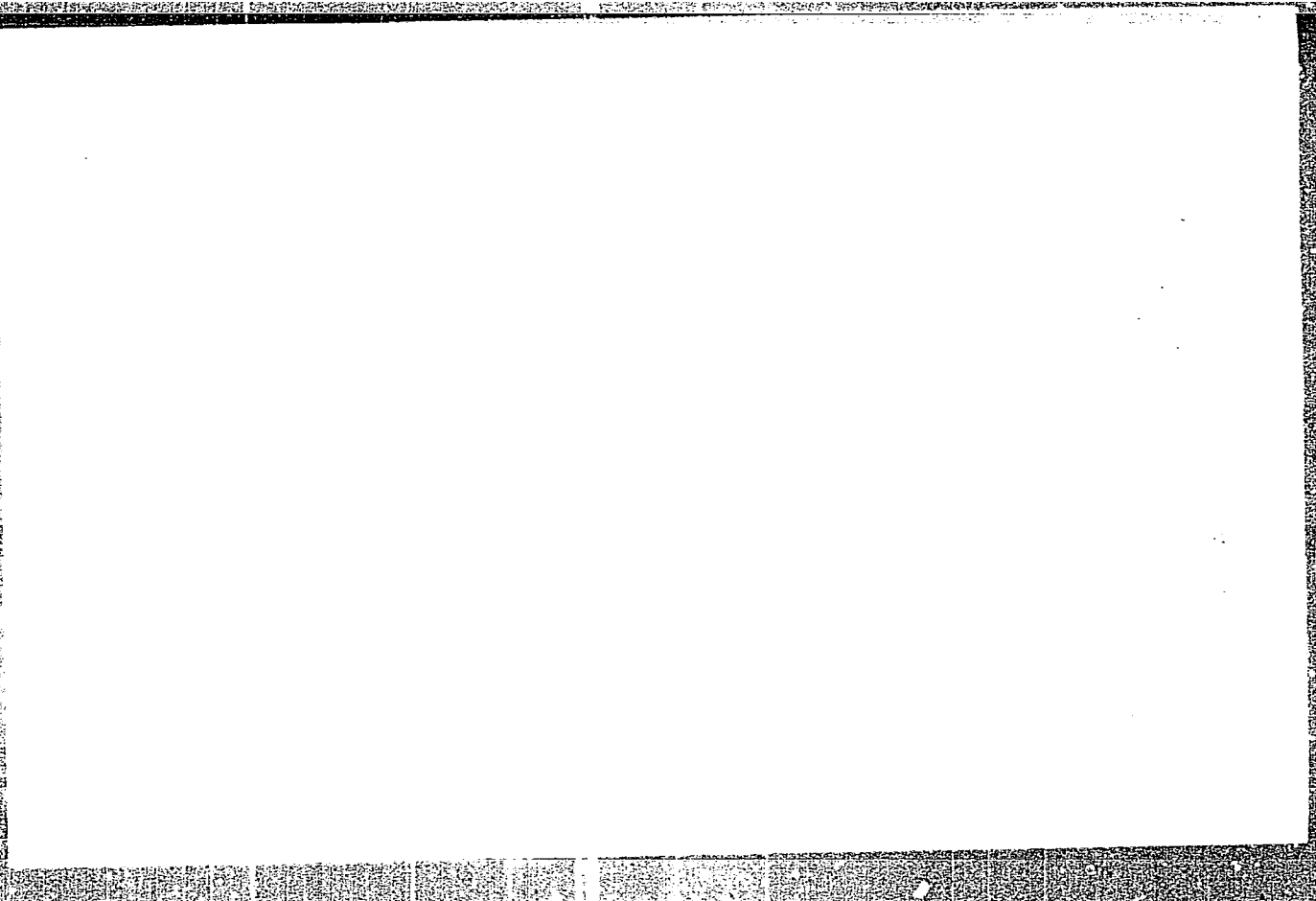
L 41783-65 - ENO-2/EMI(d)/FBD/FSS-2/EMI(1)/EEC(a)/EWP(m)/FS(v)-3/EEC(f)/

SOURCE: Inzhenernyy zhurnal, v. 4, no. 2, 1961, 392-423



**"APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001756020008-2**



**APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001756020008-2"**

1. The first of the two main parts of the report is a description of the  
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B. The second of the two main parts of the report is a description of the

APPENDIX B

SEP 1961

100

GRODZOVSKY, G. L.; IVANOV, Yu. N.; TOKAREV, V.V. (Moscow)

"Mechanics of space flight with low thrust".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

ACCESSION NR: AP4022652

S/0207/64/000/001/0090/0094

AUTHORS: Tokarev, V. V. (Moscow); Tsvetkov, V. I. (Moscow)

TITLE: Optimal form of a gamma radiation shield

SOURCE: Zhurnal priklad. mekhan. i tekhn. fiz., no. 1, 1964, 90-94

TOPIC TAGS: gamma radiation, radiation shield, optimal shield

ABSTRACT: The problem of finding the optimal form of a  $\gamma$ -radiation shield (minimal weight) for a linear source of radiation was considered by L. R. Kimel' (Opre-deleniye optimal'noy formy\* zashchitnogo bar'yera. Atomnaya energiya, 1959, t. 7, No. 3). However, the solution obtained is not applicable in all cases; for a large admissible radiation dose, the thickness at the edge of the source becomes negative. In this paper, a complete solution to the problem is obtained for linear, disk-shaped, and cylindrical radiation sources. In the case of a disk, the geometry is shown by Fig. 1 in the Enclosure. The dimensionless quantities  $\sigma$ ,  $g$ ,  $\xi$ , are introduced. These represent the radiation received at the point O, the weight of the shield, and a measure of the thickness of the shield at  $\varphi$ , respectively. The optimal form of the shield is obtained by using the method of Pontryagin. It is given by the expression

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ACCESSION NR: APL022652

$$\zeta(\varphi) = \ln \left( \frac{1 - \cos \varphi_0}{\sigma_0 \cos \varphi_0} \cos \varphi \right) \text{ for } 0 < \varphi < \varphi_0 \quad (1)$$

The weight of the optimal shield is

$$g_0 = \sec \varphi_0 - 1 + \ln \cos \varphi_0 \text{ for } 1 - \cos \varphi_0 < \sigma_0 < -\ln \cos \varphi_0$$

$$g_0 = \frac{\ln \cos \varphi_0}{\cos \varphi_0} + \frac{1 - \cos \varphi_0}{\cos \varphi_0} \left( 1 + \ln \frac{1 - \cos \varphi_0}{\sigma_0 \cos \varphi_0} \right) \text{ for } 0 < \sigma_0 < 1 - \cos \varphi_0 \quad (2)$$

where  $\varphi_*$  is the solution of

$$\sigma_0 = 1 - \cos \varphi_* + \ln \cos \varphi_* - \ln \cos \varphi_0 \quad (3)$$

The method, when applied to the cylindrical case, yields somewhat more complicated expressions for the optimal form and weight of the shield. Orig. art. has: 7 figures and 29 equations.

ASSOCIATION: none

SUBMITTED: 23Oct63

DATE ACQ: 08Apr64

ENCL: 01

SUB CODE: FH

NO REF SOV: 003

OTHER: 000

Card 2/32





$(T_{ij}, 1, \dots, T_{ij})$   $(i=1, \dots, n)$   $(j=1, \dots, m)$ .

Therefore, the problem of the defined problem can be formulated as follows:  
Let  $T_{ij}$  be the time of the  $i$ -th object in the  $j$ -th group, and let  $T_{ij}$  be the time of the  $i$ -th object in the  $j$ -th group.

By using this probabilistic formulation, the defined problem can be

Card 2/3

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ACCESSION NO: AP5002174

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... and with the  
... the maximum ... orig. art.

ACCESSION NR: AP4041565

S/0293/64/002/003/0414/0432

AUTHOR: Ivanov, Yu. N.; Tokarev, V. V.; Shalayev, Yu. V.

TITLE: Optimum trajectories and parameters of space vehicles with limited-power engines

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 414-432

TOPIC TAGS: optimum trajectory , interplanetary trajectory , optimum interplanetary trajectory , space vehicle weight, space vehicle weight parameter

ABSTRACT: A plane problem of the round-trip flight of a cosmic vehicle from the gravitational field of the earth to that of another planet is discussed. This problem of transportation of a maximum load (in variational formulation) consists of determining the optimum trajectories and optimum control of the acceleration vector due to thrust, and of the selection of the optimum weight parameters of vehicle components. The trajectory of such a flight consists of the following sections: 1) acceleration and take-off from an orbit around the earth in the terrestrial gravitational field; 2) flight

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ACCESSION NR: AP4041565

in the central field of the sun; 3) deceleration in the gravitational field of the planet and entering some orbit around it; 4) acceleration and take-off from that orbit; 5) return flight; and 6) deceleration and entering some orbit around the earth. The results of the calculation of optimum trajectories of the flight to an external planet (Mars) and internal planet (Venus) are given, as well as the data on the optimum acceleration and deceleration sections of the trajectories, and on the negligible effect of the gravitational fields of planets during flight between their orbits. For the sake of simplicity it is assumed that the orbits of planets are circular and coplanar. Orig. art. has: 17 figures, 5 tables, and 40 formulas.

ASSOCIATION: none

SUBMITTED: 21Aug63

ATD PRESS: 3055

ENCL: 00

SUB CODE: SV

NO REF SOV: 002

OTHER: 001

Card 2/2

ACCESSION NR: AP4026965

S/0258/64/004/001/0168/0196

AUTHORS: Grodzovskiy, G. L. (Moscow); Ivanov, Yu. N. (Moscow); Tokarev, V. V. (Moscow)

TITLE: Mechanics of low thrust cosmic flights. 3.

SOURCE: Inzhenernyy zhurnal, v. 4, no. 1, 1964, 168-196

TOPIC TAGS: cosmic flight optimization, power-limited vehicle, exhaust velocity, thrust vector, maximum payload, flight trajectory

ABSTRACT: The third and last series in the analysis of cosmic flight optimization of power-limited vehicles has been presented. Part One dealt with the limits of the regulating characteristics of the vehicle system. The attainable variation range for flow rate  $q$  and exhaust velocity  $V$  is investigated as a function of maximum jet thrust power  $N_{max}$ . The optimum control of the thrust vector,  $V$  and  $N$  are discussed under the conditions

$$0 \leq N(t) \leq N_{max} \quad (V) \leq N_0,$$

$$0 \leq V_{min} \leq V(t) \leq V_{max} < \infty.$$

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ACCESSION NR: AP4026965

An expression is derived relating the power source weight  $C_N$  to the flight trajectory characteristics. In Part Two the motion of a power-limited vehicle is discussed for the case of engine operation time less than the vehicle flight duration. The variational problem is considered under variable thrust power flow rate and thrust vector conditions with the optimum combination of power-limited and exhaust velocity-limited engines. It is shown that this combination yields an advantage in total payload if each type of engine has the same payload before combination. Part Four deals with reliability in engine performance for missions of long duration. The optimization criterion assumed here is the condition of a minimum in the sum of average necessary and reserve fuel weights plus the dead weight of the engine. An example is given where it is shown that in a round trip mission the departure leg takes place faster than the return leg of the trip, shifting the given engine-time break to the beginning of the trajectory. The optimization studies are extended to include weights in addition to the previously considered weights of working substance, power source, and payload. Finally, mid-course correction possibilities are studied, including corrections in velocity and position, and a general expression is derived for the optimal correction moment distribution. Orig. art. has: 145 equations, 11 figures, and 1 table.

Card 2/3

GRODZINSKIY, G.I. (Moskva); IVANOV, Yu.N. (Moskva); TOKAREV, V.V. (Moskva).

Mechanics of a space flight with low thrust. Inzh. zhur. 4  
no.2:392-423 '64 (MIRA 17:8)



TOLOBEV, V.V. (Moskva); WATI III, Yu.M. (Moskva)

Accumulator of the working substance in the problems of  
optimization of a motion with restricted power. Inzh. zhur.  
5 no.3:531-536 '65. (MIRA 18:7)

GROPZOVSKIY, G.I.; KIFORENKO, B.N.; TOKAREV, V.V.

Energy storage in problems of the optimization of motion with  
limited power. Izv. AN SSSR. Mekh. no.3:40-48 My-Je '65.  
(MIRA 18:7)

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001756020008-2

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\*\*\*\*\* Energy storage in cover-limited plant - initialization problems

**"APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001756020008-2**

**APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001756020008-2"**

ACC NR: AP6007575 SOURCE CODE: UR/0040/66/030/001/0014/0029

AUTHOR: Tokarev, V. V. (Moscow)

ORG: none

TITLE: Some questions of reliability in optimum control problems

SOURCE: Prikladnaya matematika i mekhanika, v. 30, no. 1, 1966, 14-29

TOPIC TAGS: optimum control, control system reliability, Mayer variational problem, power limited flight, velocity limited flight

ABSTRACT: The optimum control problem is analyzed with the reliability of the controlled system taken into account. The article consists of two parts. In the first part, a dynamic system described by the system of equations

$$\dot{x}_i = f_i(t, x_j, u_k, w_l) \quad (i, j=0, 1, \dots, n; k=1, \dots, r; l=1, \dots, q) \quad (1)$$

is taken, where  $x_i$  are phase coordinates,  $u_k$  are control functions, and  $w_l$  are constant control parameters. At  $t$  it is required to find a control program and control parameters such that a certain performance functional is optimized and the preassigned probability  $R$  of failure-free operation (the reliability) is ensured. The probability (reliability) that no failure will occur in the time interval  $(0, T)$  is taken as equal

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ACC NR: AP6007575

to

$$R = \exp\left(-\int_0^T \lambda dt\right), \quad (2)$$

where  $\lambda = \lambda(t, x, u, w) \geq 0$  is the failure density function. By applying the maximum principle of Pontryagin, equation (2) is written in the form of differential equations with corresponding boundary conditions which, with system (1), are the equations of the optimum control with a preassigned reliability. The optimum control problem (Mayer's variational problem) defined in this manner is applied to the study of the problem of delivering the maximum useful payload considering the motion as that of a body of variable mass in the gravitational field. Two cases are considered: delivery of the maximum useful payload by means of a thrust engine with limited jet power and with limited jet velocity. The analytic solutions of certain model problems were obtained in the first case. In the second part of the article, the problem of determining the optimal probability of failure-free operation of a jet engine is analyzed. The mathematical expectation of the maximum useful load or the minimum cost for performing of the maneuver is used as the optimality criterion. It is indicated that the problem of determining the optimal probability of the maneuver defined in the article has meaning only when the maneuver must be performed repeatedly. Some examples of solving such a problem for power-limited jet engines are presented. It is shown how the optimal probability of performing certain maneuvers depends on the optimality criterion used. Orig. art. has: 51 formulas and 13 figures. [LK]

SUB CODE: 01/ SUBM DATE: 25May65/ ORIG REF: 004/ ATD PRESS: 4216

Card 2/2 *SL*

L 05879-67 EWP(m)/EWT(1) 3N/10

ACC NR: AT6022476

SOURCE CODE: UR/0000/65/000/000/0181/0197

AUTHOR: Grodzovskiy, G. L.; Ivanov, Yu. N.; Tokarev, V. V.

ORG: None

TITLE: Optimization problems in the mechanics of low-thrust space flight

SOURCE: Vsesoyuznyy s"yezd po teoreticheskoy i prikladnoy mekhanike. 2d, Moscow, 1964. Analiticheskaya mekhanika. Ustoychivost' dvizheniya. Nebesnaya ballistika (Analytical mechanics. Stability of motion. Celestial ballistics); trudy s"yezda, no. 1, Moscow, Izd-vo Nauka, 1965, 181-197

TOPIC TAGS: trajectory optimization, space flight, thrust optimization, solar sail

ABSTRACT: The authors consider the problem of optimization in the mechanics of space flight with low thrust. Included in this problem are selection of the optimum ratios between the weight components of the spacecraft and optimum control of the thrust system as well as determination of the optimum trajectories of the flight in the aggregate. A relationship is established between the weight characteristics and parameters of the engine system and the possibilities for thrust control are discussed. Optimization of flight mechanics is considered in detail for systems using solar sails and

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L 05879-67

ACC NR: AT6022476

power-limited propulsion systems, e. g. electric reaction engines. It is shown that the problem of optimization for an ideal system resolves into two independent problems: 1. finding the optimum ratio between the weight of the power source and the weight of the working material and 2. finding the optimum trajectories and programs for the rocket acceleration vector. The literature covering the numerical solution of these problems is briefly reviewed. Orig. art. has: 13 figures, 34 formulas.

SUB CODE: 22/ SUBM DATE: 04Dec65/ORIG REF: 022/ OTH REF: 023

kh

Card 2/2

ACC NR: AR6029290

SOURCE CODE: UR/0313/66/000/006/0023/0023

AUTHOR: Grodzovskiy, G. L.; Ivanov, Yu. N.; Tokarev, V. V.

TITLE: Problems of optimization in the mechanics of cosmic flight with low thrust

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 6.62.180

REF SOURCE: Tr. II Vses. s"yezda po teor. i prikl. mekhan., 1964. Obz. dokl. Vyp. I. M., Nauka, 1965, 181-197

TOPIC TAGS: mars flight, space flight, trajectory optimization, optimum trajectory, optimal control, thrust optimization, solar sail, jet engine, thrust to weight ratio, thrust vector control

ABSTRACT: The optimization problem is reviewed as one of selecting the optimum weight characteristics for the vehicle, the optimum engine control, and the optimum trajectory. Considered as engines are the solar sail and the electrical jet engine of limited power. Two optimization problems are suggested for solution with respect to these latter: (1) calculation of optimum relationship of weights of power source and working substance, and (2) calculation of the optimum trajectory and the program for controlling the thrust vector. Examples of calculations for an earth-Mars flight are cited. Bibliography of 54 titles. V. Ponomarev. [Translation of abstract]

SUB CODE: 22

Card 1/1

ACC NR: AP7002687

SOURCE CODE: UR/0424/66/000/006/0003/0010

AUTHOR: Tokarev, V. V. (Moscow); Fatkin, Yu. M. (Moscow)

ORG: none

TITLE: The game approach to the selection of the optimum parameters of a dynamic system

SOURCE: Inzhenernyy zhurnal. Mekhanika tverdogo tela, no. 6, 1966, 3-10

TOPIC TAGS: game theory, spacecraft payload, continuous function, guidance system

ABSTRACT: The problem is formulated in terms of the theory of antagonistic games. The given parameters are the range boundaries of possible maneuvers. It was attempted to find the parameters of a dynamic system such that it is optimum in a certain sense with respect to the indicated range of the maneuvers. The game takes place between the Designer and Nature. The state of the controlled object (or dynamic system) is defined by a system of conventional differential equations. A maneuver is defined by a set of boundary values of phase coordinates and time ( $T$ ). The entirety of these values is denoted vectorially. The "quality" criterion for the performance of a maneuver is the finite value of a phase coordinate  $x_0$ .

$$x_0(T) = \text{extremum}$$

Card 1/3

ACC NR: AP7002687

In the course of the game, the Designer selects his moves so as to minimize his loss; Nature plays so as to maximize the Designer's loss with every move of the Designer. The game problem is applied to an ideal engine with limited power for the delivery of the maximum payload into space. The payload (which is a functional), is plotted in terms of a trade-off function. Several variants are considered, including: a) the parameters of the maneuvers set by Nature are not known by the Designer, and b) the parameters of the maneuvers attempted by Nature are in an interval that is known to the Designer. The game value and the optimum strategies of the Designer and Nature are evaluated. The relations between the optimum values of the parameters are illustrated in the following table

$\Delta\Phi$	0.8					0.4					0.2				
$\Phi_0$	0.01	0.1	0.19	0.01	0.1	0.2	0.4	0.5	0.59	0.01	0.1	0.2	0.4	0.6	0.7
$\Phi_1$	0.81	0.9	0.99	0.41	0.5	0.6	0.8	0.9	0.99	0.21	0.3	0.4	0.6	0.8	0.9
$\Phi^{**}$	0.31	0.34	0.38	0.01	0.20	0.28	0.4	0.5	0.59	0.01	0.1	0.2	0.4	0.6	0.7
$\Phi^{**}$	0.81	0.9	0.99	0.29	0.5	0.6	0.8	0.9	0.99	0.21	0.26	0.26	0.6	0.8	0.9
$v^*$	0.84	0.82	0.98	0.63	0.55	0.6	0.7	0.8	0.97	0.62	0.65	0.6	0.59	0.64	0.78
$v^{**}$	0.16	0.18	0.02	0.37	0.45	0.4	0.3	0.2	0.03	0.38	0.35	0.4	0.41	0.36	0.22

where  $\phi^*$ ,  $\phi^{**}$  are the parameters of the maneuvers which are favorable for Nature;

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ACC NR: AP7002587

$\Delta G^*$  is the game value;  $G_x^*$  is the unique (or singular) optimum strategy of the Designer;  $\Delta \phi = \phi_1 - \phi_0$ . The loss is measured in units or multiples of payload. Orig. art. has: 32 formulas, 5 figures, 1 table.

SUB CODE: 12,13,22/ SUBM DATE: 02Apr66/ ORIG REF: 006

Card 3/3

RIVKIN, A.I.; ~~TOKAREV~~, Ya.I.; KHITRUK, M.S.; PROKOPOVICH, A.Ye., redaktor;  
SHEMSHURINA, Ye.A., redaktor izdatel'stva; TIKHANOV, A.Ya.,  
tekhnicheskiy redaktor

[Modernization of cylindrical grinding machines; manual of  
instructions] Modernizatsiya krugloshlifoval'nykh stankov;  
rukovodiashchie materialy. Pod red. A.E.Prokopovicha. Moskva,  
Gos. nauchno-tekhn. izd-vo mashinostroit.lit-ry, 1957. 102 p.  
(MLRA 10:8)

1. Moscow. Eksperimental'nyy nauchno-issledovatel'skiy institut  
metallorezhushchikh stankov  
(Grinding machines)



TOKAREV, Ya.I.

The 312M universal cylinder-and-cone grinding machine. Biml. tekhn.-  
ekon. inform. no.3:24-25 '58. (MIRA 11:6)  
(Grinding machines)

BOKUCHAVA, Givi Vladimirovich; TOKAREV, Ya.I., inzh., retsenzent;  
BEYZEL'MAN, R.D., red. izd-va; BOROKINA, G.Ye., tekhn. red.

[Grinding metals in supplying cooling fluid through  
grinding wheel pores] Shlifovanie metallov s podachei  
okhlazhdaushchii zhidkosti skvoz' shlifoval'nyi krug.  
Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry,  
1959. 106 p. (MIRA 13:1)  
(Grinding and polishing) (Metalworking lubricants)

TOPIC TAGS: nuclear reactor, nuclear power station, ARBUZ

ABSTRACT: The requirements of atomic power stations are discussed and a description

issledovatel'skiy institut atomnykh reaktorov (Scientific Research Institute of Atomic

Card 1/3

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Card 2/3

100427  
ACCESSION NR- AP4046910

ASSOCIATION- None

SUBJECT- 00

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SUB CODE- NP

NO REF SOV- 000

00000000

POLUSHKIN, K.K.; YEMEL'YANOV, I.Ya.; DELENS, P.A.; ZVONOV, N.V.; ALEKSENKO, Yu.I.; GROZDOV, I.I.; KUZNETSOV, S.P.; SIROTKIN, A.P.; TOKAREV, Yu.I.; LAVROVSKIY, K.P.; BRODSKIY, A.M.; BELOV, A.R.; BORISYUK, Ye.V.; GRYAZEV, V.D.; POPOV, D.N.; KORYAKIN, Yu.I.; FILIPPOV, A.G.; PETROCHUK, K.V.; KHOROSHAVIN, V.D.; SAVINOV, N.P.; MESHCHERYAKOV, M.N.; PUSHKAREV, V.P.; SUROYEGIN, V.A.; GAVRILOV, P.A.; PODLAZOV, L.N.; ROGOZHNIK, I.N.; TETYUKOV, V.D.

"Arbus" atomic power plant with organic heat transfer agent and moderator. Atom. energ. 17 no.6:439 D '64 (MIRA 18:1)

L 01066-66 EPA(s)-2/EWT(m)/EWP(e)/EPF(c)/EWP(i)/EPF(n)-2/ENG(m)/EPA(w)-2/EWP(j)/T/

EWP(b) WW/JG/DM/RM/WH

ACCESSION NR: AP5014538

UR/0089/65/018/005/0478/0483

621.039.565

45B

AUTHOR: Tokarev, Yu. I.; Bogdanov, F. F.; Pavlovskaya, Ye. I.; Chernopyatova, A.P.

TITLE: Development of technology for the manufacture of filters to purify organic coolants and an investigation of their hydraulic resistance

SOURCE: Atomnaya energiya, v. 18, no. 5, 1965, 478-483

TOPIC TAGS: organic cooled reactor, organic coolant, coolant contamination, coolant filter, metal ceramic filter

ABSTRACT: The authors report the results of an experimental investigation of hydraulic resistance of metal-ceramic disc filters for organic coolants, tested under working conditions. This investigation is motivated by the fact that in organic-cooled reactors (such as "Arbus" in the SSR or OMRE in the USA) the primary loop coolant always contains some inorganic contaminants, in spite of a thorough cleaning. The technology of preparing the filters is described. Stacks of filters made of powders of different sizes were tested for filtering ability and for hydraulic resistance by means of special experiments, using monoisopropyl diphenyl at 300C as the test coolant. The set-up is briefly described. Plots of the pressure differential against the flow rate and of the local resistance to flow against the Rey-

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L 01066-66

ACCESSION NR: AP5014538

holds number are presented, and an empirical formula for the latter is derived. The test results show that the filters can be regenerated by means of a current of coolant in the opposite direction, with the contaminants discarded into an overflow tank. Orig. art. has: 5 figures, 1 formula, and 2 tables.

ASSOCIATION: none

SUBMITTED: 28Apr64

ENCL: 00

SUB CODE: NP

NR REF SOV: 005

OTHER: 001

Card 2/2 LP



L 24212-65 ENT(m)/EPF(c)/EPF(n)-2/EPR Pr-4/Ps-4/Pu-4 DM

ACCESSION NR: AP5001265

S/0080/64/017/006/0439/0448

AUTHOR: Polushkin, K. K.; Yemel'yanov, I. Ya.; Delens, P. A.; Zvonov, N. V.; Aleksenko, Yu. I.; Grozdo, I. I.; Kuznetsov, S. P.; Sirotkin, A. P.; Tokarev, Yu. I.; Lavrovskiy, K. P.; Brodskiy, A. M.; Belov, A. R.; Borislyuk, Ye. V.; Gryazev, V. M.; Tetyukov, V. D.; Popov, D. N.; Koryakin, Yu. I.; Filippov, A. G.; Petrochuk, K. V.; Khoroshavin, V. D.; Savinov, N. P.; Meshcheryakov, M. N.; Pushkarev, V. P.; Suroyegin, V. A.; Gavrilov, P. A.; Podlazov, I. N.; Rogozhkin, I. N.

TITLE: Atomic electric power installation "Arbus" with organic coolant, and moderator

SOURCE: Atomnaya energiya, v. 17, no. 6, 1964, 439-448

TOPIC TAGS: small nuclear reactor, organic coolant, organic moderator, reactor economy, nuclear reactor

ABSTRACT: The paper is a summary of the SSSR # 307 report at the Third Inter-

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L 24212-65

ACCESSION NR: AP5001265

national Conference on Peaceful Uses of Atomic Energy, 1964. It describes an installation of a reactor in which organic liquid serves as the coolant, and as the moderator. The low-power reactors of about 5 Mw are expected to be economical in the remote regions where the usual energy sources are not available. A regeneration system is described for the coolant which removes the products of radio-lysis. Orig. art. has: 7 figures

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: NP

NR REF SOV: 000

OTHER: 000

Card 2/2

TOKAREV, Yu.N.

Experience with combined experimental chemotherapy and stimulation of phagocytosis in pneumococcal infection. Antibiotiki  
4 no.1:96-100 Ja-F '59. (MIRA 12:5)

1. Kafedra farmakologii, farmatsii i farmakognozii (zav. - prof. N.V.Lezarev) Voenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.

(PNEUMOCOCCAL INFECTIONS, exper.

eff. of various antibacterial drugs with drugs stimulating phagocytosis (Rus))

(PHAGOCYTOSIS,

phagocytosis stimulating drugs with antibacterial drugs in ther. of exper. pneumococcal infect. (Rus))

(CHEMOTHERAPY,

assoc. of antibacterial drugs with phagocytosis stimulating drugs in ther. of exper. pneumococcal infect. (Rus))

TOKAROV, Yu.N.

Effect of various pyrimidine derivatives on phagocytosis.  
Farm. i toks. 22 no.2:168-172 Mr-Apr '59. (MIRA 12:6)

1. Kafedra farmakologii, farmatsii i farmakognozii Voenno-  
meditsinskoy ordena Lenina akademii imeni S.M.Kirova (nach. -  
zasluzhennyy deyatel' nauki prof. N.V.Lazarev).

(PHAGOCYTOSIS, eff. of drugs on,  
pyrimidine deriv. (Rus))

(PYRIMIDINES, effects,  
on phagocytosis (Rus))

TOKAREV, Yu.N., (kand.med.nauk; KOROL'KOV, F.N. (Kronshtadt)

Individual intolerance to osarsol. Vrach. delo no.8:133-134  
Ag '61. (MIRA 15:3)  
(ACETARSONE)

ACCESSION NR: AT4037693

S/2865/64/003/000/0226/0234

AUTHOR: Kakurin, L. I.; Tokarev, Yu. N.

TITLE: The problem of experimentally investigating the work capacity of cosmonauts as applicable to space flight tasks

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy\* kosmicheskoy biologii, v. 3, 1964, 226-234

TOPIC TAGS: Vostok, acoustics, manned space flight, simulation, cosmonaut, work capacity, crew structure

ABSTRACT: Ground experiments were conducted to determine the work capacity of cosmonauts under space-flight conditions and to arrange optimum task structuring for space crews. A mockup of the Vostok-type ships was used to simulate space-flight conditions as closely as possible. The specific objectives of the studies were 1) to work out the various tasks making up the flight program, 2) to evaluate work-rest schedules, and 3) to study the effect of sealed environment and prolonged wearing of special garb on work capacity. The subjects were healthy males trained to the peak of physical fitness who had previously taken part in similar

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ACCESSION NR: AT4037693

experiments. Dressed in special clothing, each subject sat in a couch with his back nearly horizontal. In this position he worked, took food, and rested. Once a day he could move freely about the cabin for 40 min. The experiment lasted 3 days. A chemical air regeneration system was used. The behavior and condition of the subjects were continuously observed and physiological indices were recorded every 3 hr. Besides the physiological data, an important source of information was the subject's own evaluation of his feelings. These reports, made by radio and recorded in the logbook, were regarded as very important. Work capacity was evaluated not only by exact conformity to the timetable of the experimental program but also by the quality of the performance of set tasks of various kinds. Supplementary evaluation of work capacity was based on the following tests:

- 1) Analysis of telegraph transmissions. Morse code transmissions by the subjects were recorded and analyzed. This test was scored on the basis of the time required for transmission (i.e., sending speed) and the number of errors. The best scores were made on the second day, except for one subject who made his high score at the end of the first day. Sending speed was best on the second day then gradually decreased, apparently owing to fatigue. Error analysis confirms this: related symbols accounted for most of the errors at the beginning of the experiment, but toward the end dissimilar signals were confused in most cases. It is significant

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ACCESSION NR: AT4037693

that most of the latter errors went unnoticed by the subjects. 2) Analysis of psychological and physiological tests. The subjects were required to name geometrical figures in order as they appeared on a special chart, over a microphone. The time required to read off 150 figures and the errors made were used for scoring. Another test was Krepelin's arithmetical calculation test. These tests confirm the existence of a daily efficiency cycle. In the majority of cases, work was performed more effectively in the morning hours than in the evening hours. 3) Analysis of radio reports and logbook entries. Six times a day the subjects reported medical control data, hygienic parameters of the cabin, instrument readings, and details of the operation of the life support systems. These reports were recorded on magnetic tape and then analyzed. The Morse code test is considered the most adequate of these test methods because it requires the greatest degree of coordination of neuromuscular activity with the sense organs. These investigations showed that the experimental program under evaluation simulates actual flight tasks as closely as possible, is fully within the physical capabilities of man, and may in principle be recommended for use during space flight. Since radio communication between earth and spacecraft is of the greatest importance, other experiments were conducted on auditory adaptation to background noise. Subjects were exposed to continuous noise from ventilator fans for 25 to 30 days and their auditory thresh-

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hold periodically checked for frequencies of 125, 250, 500, 1000, 3000, 4000, 6000, and 8000 cps. A sizable initial jump (1st and 2nd days) in the auditory threshold for all frequencies was followed by a relative increase in sensitivity the longer the subject remained in the new auditory environment (especially from the 15th to 25th days). This relative resensitization of the aural function is an interesting physiological phenomenon deserving further study. It may be a function of general adaptation of the organism to prolonged exposure to a new environment. The data obtained are important in that they may contribute to the solution of an extremely important problem -- the creation of an optimal acoustic background in spaceship cabins.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: PH, LS

NO REF SOV: 005

OTHER: 004

Card 4/4

ACCESSION NR: AT4042705

S/0000/63/000/000/0368/0371

AUTHOR: Myasnikov, A. L.; Akhrem-Akhremovich, R. M.; Kakurin, L. I.; Pushkar', Yu. T.; Mukharlyanov, N. M.; Georgiyevskiy, V. S.; Tokarev, Yu. N.; Senkevich, Yu. A.; Katkovskiy, B. S.; Kalinina, A. N.; Cherepakhin, M. A.; Chichkin, V. A.; Filosofov, V. K.; Shamrov, P. G.

TITLE: Effect of prolonged hypokinesia on blood circulation in man

SOURCE: Konferentsiya po aviatsionnoy i kosmicheskoy meditsine, 1963. Aviatsionnaya i kosmicheskaya meditsina (Aviation and space medicine); materialy konferentsii. Moscow, 1963, 368-371

TOPIC TAGS: isolation, prolonged isolation, isolation chamber, isolation effect, bioelectric activity

ABSTRACT: Four young men 22 to 24 were subjected to voluntary bedrest for a period of 20 days. Tests on pulse, arterial pressure, rate of blood flow, venous pressure, etc., were run before and after the completion of the experiment. These tests were performed at rest and after functional exercises (30 knee bends at the rate of one every 1.5 sec). During the period of bedrest, pulse frequency diminished on the average by 14 strokes per minute; the arterial pressure diminish-

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ACCESSION NR. AT4042705

ed by 11.2 mm of Hg. Stroke volume diminished on the average by 6 ml, while the minute rate of blood flow was reduced by 1.6 liters. After completion of the bed regime, pulse frequency rose by 18 to 34 strokes per minute, while systolic pressure and minute blood volume increased. Deep knee bends brought about characteristic increases in the pulse rate and changes in arterial pressure and phases of the cardiac cycle. The length of time required for these indices to return to normal increased from three minutes to seven minutes. It can be assumed that similar functional changes in the cardiovascular system will take place in man after his return to normal gravity following prolonged weightlessness.

ASSOCIATION: none

SUBMITTED: 27Sep63

ENCL: 00

SUB CODE: 15

NO REF SOV: 000

OTHER: 00

Cord

2/2

BELYAYEVA, V.S.; TOKAREV, Yu.N., kand.med.nauk, nauchnyy rukovoditel'

Clinical aspects and treatment of onchocerciasis in Ghana.

Med. paras.i paras.bol. 34 no.4:423-427 J1-Ag '65.

(MIRA 18:12)

1. Submitted October 24, 1964.

L 14266-66 EWT(1)/FS(v)-3 SCTB DD/RD

ACC NR: AT6003842

SOURCE CODE: UR/2865/65/004/000/0075/0079

AUTHOR: Kustov, V. V.; Mikhaylov, V. I.; Pilipyuk, Z. I.; Tokarev, Yu. N.;  
Georgiyevskiy, V. S.; Katkovskiy, B. S.; Kalinina, A. N.

ORG: none

TITLE: Changes in several physiological and biochemical indices in man after exposure to small concentrations of carbon monoxide

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 75-79

TOPIC TAGS: carbon monoxide, respiration, human physiology, test chamber, man, biochemistry, blood, central nervous system

ABSTRACT: Experiments were performed on young adult men in order to test the effects of carbon monoxide on certain biochemical indices. Each subject participated in an eight-hr background experiment (effect of hermetization) and an eight-hr experiment on the effects of carbon monoxide. A carbon monoxide concentration corresponds to the concentration of carbon monoxide exhaled by humans. The CO<sub>2</sub> concentration in the chamber did not exceed 0.6%, the air temperature was 18—22° C, the relative humid-

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L 14266-66

ACC NR: AT6003342

ity was 50—60%. The catalyzing activity of the blood, the activity of cholinesterase in blood serum, and the carboxyhemoglobin content of blood were measured in all subjects before and after the experiment. In addition standard EKG, blood pressure, oxygen consumption, and oxygen utilization were also measured. The subjects were also given mathematical problems to solve.

After an exposure of six to seven hours, the subjects manifested certain functional shifts in the cardiovascular system and external respiration, and also an increase in errors in test performance. The P, R, and T points of the EKG showed a drop in voltage. The QRS complex tended to expand (sometimes accompanied by an increased heart rate). The number of errors in all arithmetic tests showed a substantial increase.

After an eight-hr exposure to carbon monoxide, the carboxyhemoglobin content of the blood increased from  $0.66 \pm 0.056\%$  to  $1.58 \pm 0.43\%$ . This was accompanied by a statistically significant increase in the cholinesterase activity of the blood serum. The catalyzing activity of the blood did not change.

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ACC NR: AT6003842

An analysis of the data obtained makes it possible to assume that the minute physiological shifts observed in man after exposure to carbon monoxide cannot be explained as simply the result of carbon monoxide hypoxemia, since the carboxyhemoglobin content of the blood did not exceed 1.58%. It is felt that these changes are due to the effect of carbon monoxide on tissues and that this tissue effect must be taken into account in setting standards of permissible concentration of carbon monoxide in the air of hermetically sealed chambers. Orig. art. has: 3 tables. [ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 006 / OTH REF: 004

PC  
Card 3/3

L 14272-66 EWT(1)/FS(v)-3 SCTB DD/RD

ACC NR: AT6003837

SOURCE CODE: UR/2865/65/004/000/0027/0030

AUTHOR: Georgiyevskiy, V. S.; Kakurin, L. I.; Kalinina, A. N.; Katkovskiy, B. S.;  
Kustov, V. V.; Mikhaylov, V. I.; Pilipyuk, Z. I.; Tokarev, Yu. N.

ORG: none

TITLE: Effects of eight-hour isolation and hypokinesia on several physiological  
and biochemical indices in man

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy  
biologii, v. 4, 1965, 27-30

TOPIC TAGS: isolation test, hypokinesia, test chamber, respiration, human  
physiology, biochemistry, man, EKG, blood pressure, blood circulation,  
physiologic parameter

ABSTRACT: A study was performed in order to determine the effects of short-term  
isolation and hypokinesia on the basic physiological and biochemical indices  
of man. Ten young men, 21—24 years of age, were kept for 8 hours in a  
sitting position in a hermetically sealed chamber with forced ventilation  
of atmospheric air. The oxygen content was 20—21%, and the CO<sub>2</sub> content  
was 0.01—0.03%. The temperature varied between 20—22° C and the  
relative humidity between 50—60%. The parameters measured included the  
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ACC NR: AT6003837

standard EKG, pulse frequency, arterial blood pressure, stroke and minute volumes of blood circulation, peripheral resistance, and the cardiac index. In addition, the frequency, depth, and per minute volume of respiration were measured, along with oxygen consumption, the coefficient of oxygen utilization, the amount of oxygen consumed from 1 liter of air, the vital capacity of the lungs, and certain other indices.

After 8 hours of isolation and hypokinesia, the majority of the subjects showed a diminution in pulse frequency (16%), an insignificant increase in stroke volume (11%), a diminution in per minute volume, and an increase in peripheral circulatory resistance (23%). Except for a slight tendency to bradycardia, the EKG did not show any deviations. Although changes in the respiratory functions were varied, they did not exceed limits of normal physiological-variation, except for a tendency toward retardation of forced exhalation of air of about 0.5 sec. After physical exercise, oxygen debt in most of the subjects was cancelled somewhat sooner, while ventilation debt was cancelled more slowly. Energy expenditures required by physical exercise dropped after the experiment at the expense of a diminution in oxygen debt. The number of errors in psychological (intelligence) tests

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ACC NR: AT6003837

tended to increase toward the end of the experiment, indicating a certain degree of inertia in nervous processes. The amount of carboxyhemoglobin in the blood diminished from  $1.48 \pm 0.48$  to  $0.51 \pm 0.26$  after the experiment and, the catalyzing activity of the blood increased. Both of these changes were statistically significant. The cholinesterase activity of the blood serum diminished by 8.8%. No significant changes were noted in the urea content of the blood. At the same time, the amount of ammonia and urea in urine tended to diminish. In general, 8 hours of isolation and hypokinesia did not lead to any substantial functional shift in the human organism. Orig. art. has: 3 tables. [ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 002

CC  
Card 3/3

TOKAREV, Yu.N.; BELYAYEVA, V.S.

Blood pressure level in young and middle-aged men in Ghana.

Kardiologiya 4 no.6:84-85 N-D '64.

(MIRA 18:8)

GEORGIYEVSKIY, V.S.; KAKURIN, L.I.; KALININA, A.N.; KATKOVSKIY, B.S.;  
KUSTOV, V.V.; MIKHAYLOV, V.I.; PILIPYUK, Z.I.; TOKAREV, Yu.N.

Effect of eight-hour isolation and hypokinesia on some physiological and biochemical indices in man. Probl. kosm. biol.  
4:27-30 '65. (MIRA 18:9)

KUSTOV, V.V.; MIKHAYLOV, V.I.; PILIPYUK, Z.I.; TOKAREV, Yu.N.; GEORGIYEVSKIY,  
V.S.; KATKOVSKIY, B.S.; KALININA, A.N.

Change in some physiological and biochemical indices of man  
subjected to carbon monoxide in low concentrations. Probl.  
kosm. biol. 4:75-79 '65. (MIRA 18:9)

AMOSOV, N.N.; DUBIN, A.S.; ZUBKOV, V.A.; STARTSEV, V.I.; TOKAREV,  
Yu.S.; SHKARATAN, O.I.; KURTYNIN, M.S., red.; ZHEREBKINA,  
D.I., red.; LEVCNEVSKAYA, L.G., tekhn. red.

[A generation of shock workers; a collection of documents  
and materials on socialist competition in Leningrad  
industrial plants in 1928-1961] Pokoleniia udarnikov;  
sbornik dokumentov i materialov o sotsialisticheskoy sorev-  
novanii na predpriyatiyakh Leningrada v 1928-1961 gg. Le-  
ningrad, Leninfizdat, 1963. 454 p. (MIRA 16:9)

1. Leningrad. (Province) Gosudarstvennyy arkhiv Oktyabr'skoy  
revolyutsii i sotsialisticheskogo stroitel'stva.  
(Leningrad--Socialist competition)

ACCESSION NR: AP4031627

S/0203/64/004/002/0243/0246

AUTHORS: Getmantsev, G. G.; Tokarev, Yu. V.

TITLE: Nonthermal galactic radio emission and the electronic component of cosmic rays in a nonstationary approximation

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 2, 1964, 243-246

TOPIC TAGS: radio astronomy, cosmic ray, cosmic ray electron component, relativistic cosmic electron, cosmic electron formation, cosmic electron energy spectrum, nonthermal galactic radio emission, nonthermal emission frequency spectrum

ABSTRACT: The steady-state model of relativistic cosmic electron formation is shown to be incompatible with recent radio-astronomical observations. A simple nonstationary model is proposed from which the electron energy spectrum is derived. It is assumed that the relativistic electrons are formed as a result of collisions between heavy cosmic particles and interstellar gas nuclei and, hence, have the same initial energy spectrum as the heavy particles producing them. It is further assumed that the heavy cosmic particles have a relict origin, i.e., they were formed during the youth of the galaxy. Only energy losses due to synchrotron

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ACCESSION NR: AP4031627

radiation are considered in the computation of the electron energy spectrum (these losses predominate in the particle energy range of interest corresponding to nonthermal radio emission of wavelengths)

$$\lambda \lesssim 10^4 \mu$$

The effect on the form of the energy spectrum due to the limiting cases of the parameter

$$\alpha = T_{\pi}/T_e$$

is discussed, where  $T_{\pi}$  is the lifetime of the heavy cosmic particles forming the secondary relativistic electrons with a lifetime  $T_e$ . For

$$\alpha \rightarrow \infty$$

it is found that for sufficiently small  $T_e$  the electron energy spectrum coincides with that of the heavy particles. However, as  $T_e$  increases, the electron spectrum becomes steeper due to synchrotron losses. In the other limiting case

$$\alpha \rightarrow 0,$$

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ACCESSION NR: AP4031627

for sufficiently small  $T_{\pi}$  the energy spectrum has a sharp discontinuity. As

$T_{\pi} \rightarrow \infty$

(the steady-state model of relativistic electron formation), the bend completely disappears. From the energy spectrum for the relativistic electrons the frequency spectrum of their synchrotron radio emission can be found, having a similar form. The existing experimental data are not sufficiently reliable to compute estimates of the various parameters in the expressions for the electron energy spectrum. However, a bend in the frequency spectrum is observed, indicating that the steady-state model can not be correct. Orig. art. has: 4 equations.

ASSOCIATION: Radiofizicheskiy institut pri Gor'kovskom gosudarstvennon universitete (Radiophysics Institute of Gorkiy State University)

SUBMITTED: 15Sep62

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: AA

NO REF SOV: 003

OTHER: 007

Card 3/3

GETMANTSEV, G.G.; TOKAREV, Yu.V.

Nonthermal galactic radio emission and the electron component of  
cosmic rays in nonsteady-state approximation. Geomag. i aer. 4  
no.2:243-246 Mr-Apr '64. (MIRA 17:4)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom  
universitete.

TOKAREV, Zh.V.; DUBITSKIY, G.M.

Irregularity of feeder performance. Lit.proizv. no.2:27-28  
F '62. (MIRA 15:2)

(Risers (Founding))

PORUCHIKOV, Yu. P.; TOKAREV, Zh.V.; SHATOV, A. Ya.

Selection of an efficient shape and size of risers for steel  
castings. Izv. vys. ucheb. zav.; obern. met. 7 no.6:144-148  
'64. (MIRA 17:7)

1. Ural'skiy politekhnicheskiy institut.